2700
AF$

OIPE IAP59
JAN 09 2006
PATENT & TRADEMARK OFFICE

HEWLETT-PACKARD COMPANY
Intellectual Property Administration
P.O. Box 272400
Fort Collins, Colorado 80527-2400

PATENT APPLICATION

ATTORNEY DOCKET NO. 10013111-1

IN THE
UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor(s): N. Lee Rhodes

Confirmation No.: 3660

Application No.: 09/919,527

Examiner: Lashanya Nash

Filing Date: July 31, 2001

Group Art Unit: 2153

Title: NETWORK USAGE ANALYSIS SYSTEM AND METHOD FOR UPDATING STATISTICAL MODELS

Mail Stop Appeal Brief-Patents
Commissioner For Patents
PO Box 1450
Alexandria, VA 22313-1450

TRANSMITTAL OF APPEAL BRIEF

Transmitted herewith is the Appeal Brief in this application with respect to the Notice of Appeal filed on October 31, 2005.

The fee for filing this Appeal Brief is (37 CFR 1.17(c)) $500.00.

(complete (a) or (b) as applicable)

The proceedings herein are for a patent application and the provisions of 37 CFR 1.136(a) apply.

☐ (a) Applicant petitions for an extension of time under 37 CFR 1.136 (fees: 37 CFR 1.17(a)-(d)) for the total number of months checked below:

☐ 1st Month $120 ☐ 2nd Month $450 ☐ 3rd Month $1020 ☐ 4th Month $1590

☐ The extension fee has already been filed in this application.

☒ (b) Applicant believes that no extension of time is required. However, this conditional petition is being made to provide for the possibility that applicant has inadvertently overlooked the need for a petition and fee for extension of time.

Please charge to Deposit Account 08-2025 the sum of $ 500 . At any time during the pendency of this application, please charge any fees required or credit any over payment to Deposit Account 08-2025 pursuant to 37 CFR 1.25. Additionally please charge any fees to Deposit Account 08-2025 under 37 CFR 1.16 through 1.21 inclusive, and any other sections in Title 37 of the Code of Federal Regulations that may regulate fees. A duplicate copy of this sheet is enclosed.

☒ I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Commissioner for Patents, Alexandria, VA 22313-1450

Date of Deposit: January 2, 2006

OR

☐ I hereby certify that this paper is being transmitted to the Patent and Trademark Office facsimile number (571)273-8300.

Date of facsimile:

Typed Name: Steven E. Dicke

Signature: Steven E. Dicke

Respectfully submitted,

N. Lee Rhodes

By Steven E. Dicke

Steven E. Dicke

Attorney/Agent for Applicant(s)

Reg No. : 38,431

Date : January 2, 2006

Telephone : (612) 573-2002

Rev 10/05 (AplBrief)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Applicant:	N. Lee Rhodes	Examiner:	Lashanya Nash
Serial No.:	09/919,527	Group Art Unit:	2153
Filed:	July 31, 2001	Docket No.:	10013111-1
Title:	NETWORK USAGE ANALYSIS SYSTEM AND METHOD FOR UPDATING STATISTICAL MODELS		

APPEAL BRIEF UNDER 37 C.F.R. § 41.37

Mail Stop Appeal Brief – Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir/Madam:

This Appeal Brief is submitted in support of the Notice of Appeal filed on October 31, 2005, appealing the final rejection of claims 1-47 of the above-identified application as set forth in the Final Office Action mailed June 30, 2005.

The U.S. Patent and Trademark Office is hereby authorized to charge Deposit Account No. 08-2025 in the amount of $500.00 for filing a Brief in Support of an Appeal as set forth under 37 C.F.R. § 41.20(b)(2). At any time during the pendency of this application, please charge any required fees or credit any overpayment to Deposit Account No. 08-2025.

Appellant respectfully requests consideration and reversal of the Examiner's rejection of pending claims 1-47.

TABLE OF CONTENTS

REAL PARTY IN INTEREST

The real party in interest is Hewlett-Packard Development Company, LP having a principle place of business at 20555 S.H. 249 Houston, TX 77070, U.S.A. (hereinafter "HPDC"). HPDC is a Texas limited partnership and is a wholly-owned affiliate of Hewlett-Packard Company, a Delaware corporation, headquartered in Palo Alto, CA. The general or managing partner of HPDC is HPQ Holdings, LLC.

RELATED APPEALS AND INTERFERENCES

There are no other prior and pending appeals, interferences or judicial proceedings that may be related to, directly affected by or having a bearing on the Board's decision in this Appeal.

STATUS OF CLAIMS

Claims 1-47 were rejected in a Final Office Action mailed June 30, 2005. Claims 1-47 are pending in the application and are subject of the present Appeal.

STATUS OF AMENDMENTS

No Amendments to the claims have been filed subsequent to the Final Office Action mailed June 30, 2005.

SUMMARY OF THE CLAIMED SUBJECT MATTER

The summary is set forth as an exemplary embodiment as the language corresponding to independent claims 1, 13, 23, 29, 37, 45, and 46. Discussions about elements of claims 1, 13, 23, 29, 37, 45, and 46 can be found at least at the cited locations in the specification and drawings.

One aspect of the present invention, as claimed in independent claim 1, provides a method for analyzing a stream of network usage data (25) comprising generating a statistical model (34) from a set of usage data record events (25). *See Specification* at page 14, line 18 through page 15, line 10; and Figure 1. The method includes receiving a most recent record event (52) and updating the statistical model (34) using the most recent record event (52) by adding the most recent record event (52) to the statistical model (34). An identifier is

associated with each record event (25). The method includes updating only a portion of the statistical model (34) associated with the identifier. *See specification* at page10, line 27 through page 11, line 12; page 14, line 18 through page 15, line 10; and Figures 1, 2, 7 and 8.

Another aspect of the present invention, as claimed in independent claim 13, provides a method for analyzing a stream of network usage data (25) over a rolling time interval. The method includes defining a statistical model (34) for analyzing the stream of network usage data (25) over the rolling time interval, defining the rolling time interval to include a plurality of update time intervals (210); and receiving a record event from the stream of data for each update time interval (210). The method includes storing the record event for each update interval (210) in a history cache (24), generating the statistical model (34) over the rolling time interval using the statistical model (34) and each record event stored in the history cache (24), and updating the statistical model (34) using the statistical model (34) and a most recent record event (218) for a most recent update time interval (220), including updating only a portion of the statistical model (34) associated with the most recent record event (218). *See specification* at page 10, line 27 through page 11, line 12; page 14, line 18 through page 17, line 2; and Figures 1, 7, 8, and 9.

Yet another aspect of the present invention as claimed in independent claim 23, provides a method for analyzing a stream of network usage data (25) over a rolling time interval. The method includes defining a statistical model (34) for analyzing the stream of network usage data (25) over the rolling time interval, defining the rolling time interval to include a plurality of update time intervals (210), and receiving a record event set from the stream of data for each update time interval (210). Each record event set (70) includes one or more record events (72, 74, 76). Each record event (72, 74, 76) is associated with a user identifier. The method includes storing the record event set (70) for each update interval in a history cache (24), generating the statistical model (34) over the rolling time interval using each record event (72, 74, 76) stored in the history cache (24), and updating only a portion of the statistical model (34) associated with the most recent record event (218) for a most recent update time interval (220). *See specification* at page 10, line 27 through page 11, line 12; page 14, line 18 through page 17, line 2; and Figures 1, 7, 8, and 9.

Yet another aspect of the present invention, as claimed in independent claim 29, provides a method for analyzing a stream of network usage data (25) over a rolling time

interval. The method includes defining a statistical model (34, 130, 300) for analyzing the stream of network (28) usage data over the rolling time interval. The statistical model (34, 130, 300) includes a histogram having a first axis (132, 302) illustrating total usage defined by a number of bins (136, 306), and a second axis (134, 304). Each bin has a usage variable range. The second axis is defined by a frequency corresponding to a number of users having a total usage within the usage variable range of each bin (136, 306). The method includes defining the rolling time interval to include a plurality of update time intervals; receiving a record event set from the stream of network (28) data for each update time interval (210), and storing the record event set (70) for each update interval (210) in a history cache (24). The method includes generating the statistical model (34) over the rolling time interval using each record event stored in the history cache (24) including generating an aggregation table (40, 100) and updating the statistical model (34) using a most recent record event (52) for a most recent update time interval including updating only a portion of the aggregation table (40, 100) associated with the most recent update time interval. *See specification* at page 10, line 27 through page 11, line 12; page 14, line 18 through page 17, line 2; and Figures 1, 5, 7, 8, and 9

Yet another aspect of the present invention, as claimed in independent claim 37, provides a network (28) usage analysis system (20) for analyzing a stream of network usage data (25). The system includes a data analysis system server (22) which generates a statistical model from a set of usage data record events, and upon receiving a most recent record event (52), the data analysis system server (22) updates the statistical model using the most recent record event (52) by adding the most recent record event (52) to the statistical model. An identifier is associated with each record event. The system includes updating only a portion of the statistical model associated with the identifier. *See specification* at page 8, line 9 through 11, line 21; page 14, line 18 through page 15, line 10; and Figures 1, 7 and 8.

Yet another aspect of the present invention, as claimed in independent claim 45, provides a computer-readable medium having computer executable instructions for performing a method for analyzing a stream of network usage data. The method includes generating a statistical model (34, 130, 300) from a set of usage data record events (25), receiving a most recent record event (52), and updating the statistical model (34) using the

most recent record event (52) by adding the most recent record event (52) to the statistical model (34). An identifier is associated with each record event. The method includes updating only a portion of the statistical model (34, 130, 300) associated with the identifier. *See specification* at page 14, line 18 through page 15, line 10; and Figures 1, 2, 6, 7, 8 and 12

Yet another aspect of the present invention, as claimed in independent claim 46, provides a method for analyzing a stream of network (28) usage data. The method includes generating a statistical model (34, 130, 300) from a set of network usage record events, receiving a most recent record event (52), and updating the statistical model (34, 130, 300) using the most recent record event (52) by adding the most recent record event (52) to the statistical model (34, 130, 300). The method includes storing the set of record events (70) in a history cache (24). If the history cache (24) is full, updating the statistical model (34, 130, 300) includes removing a most recent record event (54) from the statistical model (34, 130, 300). The method includes defining the statistical model (34, 130, 300) to include an aggregation of each record event set (70) stored in the history cache (24). An identifier is associated with each record event (72, 74, 76). Generating a statistical model (34, 130, 300) from the set of record events (70) includes generating an aggregation table (120) for tracking an aggregation of record events associated with an identifier. The most recent record event (52) is associated with an identifier. Updating the statistical model (34, 130, 300) includes updating only the aggregation of record events in the tracking table for that identifier. The method includes generating a histogram statistical model (34, 130, 300) from the aggregation table (100). The history cache (24) is an array of memory segments (206). The number of memory segments is equal to the number of update time intervals in the rolling time interval. The method includes storing each record event (72, 74, 76) in a memory segment in the history cache (24) and defining an index array associated with the statistical model including a set of contiguous index segments. Each index segment includes a pointer to the memory segment in the history cache (24) storing the next consecutive record event. The method includes defining a first pointer (226) to the index segment associated with the memory segment storing the most recent record event (218). Upon receiving a most recent record event (218) the method replacing the most recent record event (218) stored in the history cache (24) with the most recent record event (228), and further moving the first pointer (226)

to the next contiguous index segment. *See specification* at page 10, line 27 through page 11, line 12; page 14, line 18 through page 20, line 6; and Figures 1, 2, and 4-15.

GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

I. Whether claims 1, 2, 37, 38, and 45 are patentable under 35 U.S.C. §103(a) over Porras et al., U.S. Patent No. 6,321,338 ("Porras") in view of Fishman et al., U.S. Patent Application Publication 2001/0037321 ("Fishman").

II. Whether claim 13 is patentable under 35 U.S.C. §103(a) over Porras in view of Sarkissian et al., U.S. Patent No. 6,771,646 ("Sarkissian") and Fishman.

III. Whether claim 23 is patentable under 35 U.S.C. §103(a) over Porras in view of Sarkissian and further in view of Kawasaki, U.S. Patent No. 6,539,375 ("Kawasaki") and Fishman.

IV. Whether claims 29-36 are patentable under 35 U.S.C. §103(a) over Porras in view of Sarkissian, Fishman, Costa, U.S. Patent No. 6,138,121 ("Costa"), and Aboulnaga, U.S. Patent No. 6,460,045 ("Aboulnaga").

V. Whether claims 3 and 39 are patentable under 35 U.S.C. §103(a) over Porras, and further in view of Steinbiss et al., U.S. Patent No. 6,823,307 ("Steinbiss").

VI. Whether claims 4 and 40 are patentable under 35 U.S.C. §103(a) over Porras, Fishman, Steinbiss and further in view of Sarkissian.

VII. Whether claims 5, 6, 8-10, 12, and 41-43 are patentable under 35 U.S.C. §103(a) over Porras, Fishman, Steinbiss, Sarkissian and further in view of Costa.

VIII. Whether claims 7, 11, 14-22, 46 and 47 are patentable under 35 U.S.C. §103(a) over Porras, Fishman, Steinbiss, Sarkissian, Costa, and further in view of Aboulnaga.

IX. Whether claims 8-10, 43, and 44 are patentable under 35 U.S.C. § 103(a) over Porras, Steinbiss, Sarkissian, Costa, and further in view of Fishman.

X. Whether claim 24 is patentable under 35 U.S.C. §103(a) over Porras, Sarkissian, Kawasaki, Fishman, and further in view of Steinbiss.

XI. Whether claims 25 and 26 are patentable under 35 U.S.C. §103(a) over Porras, Sarkissian, Kawasaki, Fishman, and further in view of Costa.

XII. Whether claims 27 and 28 are patentable under 35 U.S.C. §103(a) over Porras, Sarkissian, Kawasaki, Fishman, Costa, and further in view of Aboulnaga.

ARGUMENT

The rejection of claims 1-47 under 35 U.S.C. §103

The claims do not stand together or fall together. Instead, Applicant presents separate arguments for various independent and dependent claims. Each of these arguments is separately presented below and presented with separate headings and sub-headings as required by 37 CFR § 41.37(c) (1) (vii) as follows:

I. Claims 1, 2, 37, 38, and 45, with claims 1, 2, 37, 38, and 45 selected for discussion

II. Claims 13-22, with claim 13 and 14 selected for discussion

III. Claims 23-28, with claim 23 selected for discussion

IV. Claims 29-36, with claim 29 selected for discussion

V. Claims 3-4, 5-12, 39-40, and 41-44, with claims 3 and 39 selected for discussion

VI. Claims 46-47, with claim 46 selected for discussion

I. Rejection of claims 1-2, 37-38, and 45 as being unpatentable under 35 U.S.C. §103(a)

Claims 1, 2, 37-38, and 45 are rejected under 35 U.S.C. §103(a) as being unpatentable over Porras in view of Fishman.

Applicable Law.

Referring to 35 U.S.C. § 103(a), a patent may not be obtained though the invention is not identically disclosed or described as set forth in 35 U.S.C. § 102, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

With regard to 35 U.S.C. § 103, "Patent examiners carry the responsibility of making sure that the standard of patentability enunciated by the Supreme Court and by the Congress is applied in <u>each and every case</u>." M.P.E.P. 2141 (emphasis in the original). The Examiner

bears the burden under 35 U.S.C. § 103 in establishing a *prima facie* case of obviousness. *In re Fine*, 837 F.2d 1071, 1074, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988).

Three criteria must be satisfied to establish a *prima facie* case of obviousness. First, the Examiner must show that some objective teaching in the prior art or some knowledge generally available to one of ordinary skill in the art would teach, suggest, or motivate one to modify a reference or to combine the teachings of multiple references. *In re Fine* at 1074. Second, the prior art can be modified or combined only so long as there is a reasonable expectation of success. *In re Merck & Co., Inc.*, 800 F.2d 1091, 231 USPQ 375, 379 (Fed. Cir. 1986). Third, the reference or combined references must teach or suggest all of the claim limitations. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (C.C.P.A. 1974).

The court in *Fine* stated:

> Obviousness is tested by "what the combined teaching of the references would have suggested to those of ordinary skill in the art." But it "cannot be established by combining the teachings of the prior art to produce the claimed invention, absent some teaching or suggestion supporting the combination." And "teachings of references can be combined *only* if there is some suggestion or incentive to do so." *In re Fine*, 5 USPQ2d at 1599 (citations omitted).

There must be some teaching somewhere that provides the suggestion or motivation to combine prior art teachings and applies that combination to solve the same or similar problem that it addresses. *In re Nilssen*, 851 F.2d 1401, 1403, 7 USPQ2d 1500, 1502 (Fed. Cir. 1988); *In re Wood*, 599 F.2d 1032, 1037, 202 USPQ 171, 174 (C.C.P.A. 1979). In particular, "The teaching or suggestion to make the claimed combination and the reasonable expectation of success must <u>both</u> be found in the prior art, and not based upon Appellants' disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991); M.P.E.P. § 2142 (emphasis added).

In order for prior art references to be properly applicable under 35 U.S.C. §103, there must be some teaching that the prior art attempts to solve the same or similar problem that the applicant's invention addresses. *In re Nilssen*, 851 F.2d 1401, 1403, 7 USPQ2d 1500, 1502 (Fed. Cir. 1988); *In re Wood*, 599 F.2d 1032, 1037, 202 USPQ 171, 174 (CCPA 1979). In other words, a *prima facie* case of obviousness cannot be established if based upon a reference that is non-analogous art. *In re Deminski*, 796 F.2d 436, 442, 230 USPQ 313, 315 (Fed. Cir. 1986); *In re Clay*, 966 F.2d 656, 658, 23 USPQ2d 1058, 1060-61 (Fed. Cir. 1992).

Two factors define whether a reference is analogous art: (1) whether the art is from the same field of endeavor, regardless of the problem addressed and, (2) if the reference is not within the field of the inventor's endeavor, whether the reference still is reasonably pertinent to the particular problem with which the inventor is involved. *In re Deminski*, 796 F.2d at 442, 230 USPQ at 315.

> A reference is reasonably pertinent if . . . it is one which, because of the matter with which it deals, logically would have commended itself to the inventor's attention in considering his problem . . . If a reference disclosure has the same purpose as the claimed invention, the reference relates to the same problem . . . If is directed to a different purpose, the inventor would accordingly have had less motivation or occasion to consider it.

In re Clay, 966 F.2d at 658, 23 USPQ2d at 1060-61.

The test for obviousness under § 103 must take into consideration the invention as a whole; that is, one must consider the particular problem solved by the combination of elements that define the invention. *Interconnect Planning Corp. v. Feil*, 774 F.2d 1132, 1143, 227 USPQ 543, 551 (Fed. Cir. 1985). Furthermore, claims must be interpreted in light of the specification, claim language, other claims, and prosecution history. *Panduit Corp. v. Dennison Mfg. Co.*, 810 F.2d 1561, 1568, 1 USPQ2d 1593, 1597 (Fed. Cir. 1987), *cert. denied*, 481 U.S. 1052 (1987). At the same time, a prior patent cited as a § 103 reference must be considered in its entirety, "*i.e.* as a *whole*, including portions that lead away from the invention." *Id.* That is, the Examiner must recognize and consider not only the similarities, but also the <u>critical differences between the claimed invention and the prior art</u> as one of the factual inquiries pertinent to any obviousness inquiry under 35 U.S.C. § 103. *In re Bond*, 910 F.2d 831, 834, 15 USPQ2d 1566, 1568 (Fed. Cir. 1990) (emphasis added). Finally, the Examiner must avoid hindsight. *Id.*

With regard for the test for obviousness under § 103, a statement that modifications of the prior art to meet the claimed invention would have been " '<u>well within the ordinary skill of the art</u> at the time the claimed invention was made' " because the references relied upon teach that all aspects of the claimed invention were individually known in the art is not sufficient to establish a *prima facie* case of obviousness without some objective reason to combine the teachings of the references. *Ex parte Levengood*, 28 USPQ2d 1300 (Bd. Pat. App. & Inter. 1993); M.P.E.P. § 2143.01 (emphasis in the original).

In conclusion, appellants are entitled to a patent grant if any one of the elements of a *prima facie* case of obviousness is not established. The Federal Circuit has endorsed this view in stating: "If examination at the initial stage does not produce a *prima facie* case of unpatentability, then without more the appellants are entitled to grant of the patent." *In re Oetiker*, 977 F.2d 1443, 1446, 24 USPQ2d 1443, 1448 (Fed. Cir. 1992).

Independent claim 1 recites a method for analyzing a stream of network usage data. The method includes generating a statistical model from a set of usage data record events. The method includes updating a statistical model using the most recent record event by adding the most recent record event to the statistical model, wherein an identifier is associated with each record event, including updating only a portion of the statistical model associated with the identifier.

Porras discloses a method of network surveillance including building at least one long-term and at least one short-term statistical profile of network packets that monitor data transfers, errors, or network connections. The long-term profile is compared to the short-term profile to determine whether suspicious network activity exists. (Col. 1, lines 44-54).

Fishman recites a method of building predictive models based on transactional data. In the system of Fishman, sets of aggregation models are utilized, wherein each transactional source of data is processed by a dedicated aggregation module. When a new transactional record becomes available the output of the model is updated by processing the new records only associated with a dedicated aggregation module. The output of each aggregation module is an array of scalar numbers that can be used as an input to a traditional modeling module. (Paragraph 8).

The Examiner admits that Porras fails to disclose updating only a portion of the statistical model associated with the identifier. The Examiner submits that this limitation is taught by Fishman. (Office Action mailed June 30, 2005, page 5).

Fishman also does not teach or suggest **updating only a portion of the statistical model associated with the identifier**. In contrast, Fishman discloses updating the *aggregation module outputs* with each new transactional record. All aggregation module outputs combined with the traditional array of scalar inputs 26 are used as input attributes for the traditional modeling module 20 that implements logistic regression, neural networks, or radial basis functions technology. (See Fishman, paragraph 24). Accumulated values of f_k^1

are combined with the traditional array of scalar inputs S 322 and are used as input attributes for the traditional modeling module 324. Output of the model is calculated in the traditional modeling module 328. (Paragraphs 31 and 32). The new transactional record is processed 412 and outputs of the corresponding aggregation module is updated 414. New values of f_k^1 are combined with the traditional array of scalar inputs S 416 and are used as input attributes for the traditional modeling module 418. These values may be stored again 420 for further model output updates. Output of the model is calculated in the traditional modeling module 422. (Paragraphs 39-41).

Therefore, Fishman discloses updating the outputs of the aggregation module that provide the traditional array of scalar inputs to the traditional modeling module. In Fishman, the statistical model is not partially updated, but rather the entire statistical model is updated/recalculated based on a new set of scalar inputs provided by the aggregation module.

Further, there is no teaching or suggestion to combine Porras and Fishman. There is no teaching in Porras or Fishman to combine the method of building predictive models on transactional data of Fishman with the network surveillance system of Porras.

In view of the above, Porras and Fishman, either alone, or in combination, fail to teach or suggest the invention of independent claim 1. Accordingly, reversal of the rejection of claim 1 under 35 U.S.C. §103(a) is respectfully requested.

Dependent Claim 2 recites **updating the statistical model further comprises removing a least recent record event from the statistical model**. The Examiner submits that Porras explicitly shows these limitations in column 6, lines 47-50, which state that at update time (typically, a time of low system activity), the update function folds the short-term values observed since the last update into the long-term profile, and the short-term profile is cleared. This statement in Porras discloses clearing the entire short-term profile. In contrast, claims 2 recites removing a *least recent record event* from the *statistical model*. In addition, claim 2 further defines patentably distinct claim 1.

In view of the above, claim 2 is also believed to be allowable over the cited references. Additionally, claim 2 further defines patentably distinct claim 1. Accordingly, reversal of the rejection of claim 2 under 35 U.S.C. §103(a) is respectfully requested.

Independent claim 37 recites a network usage analysis system for analyzing a stream of network usage data. The network usage analysis system includes a data analysis system

server which upon receiving a most recent record event, the data analysis system server updates the statistical model using the most recent record event by adding the most recent record event to the statistical model, wherein an identifier is associated with each record event, including **updating only a portion of the statistical model associated with the identifier.**

Independent claim 45 recites a computer readable medium having computer executable instructions for performing a method for analyzing a stream of network usage data. The method includes updating the statistical model using the most recent record event by adding the most recent record event to the statistical model, wherein an identifier is associated with each record event, including **updating only a portion of the statistical model associated with the identifier.**

For the same reasons as discussed above with reference to claim 1, Porras and Fishman, either alone, or in combination, fail to teach or suggest the invention of independent claims 37 and 45. Accordingly, reversal of the rejection of claims 37 and 45 under 35 U.S.C. §103(a) is respectfully requested.

Dependent claim 38 recites **wherein the data analysis system server removes the least recent record event from the statistical model**. For the same reasons as discussed above with reference to claim 2, claim 38 is also believed to be allowable over the cited references. Reversal of the rejection of claim 38 under 35 U.S.C. §103(a) is respectfully requested.

II. Rejection of claims 13-22 as being unpatentable under 35 U.S.C. §103(a)

Claim 13 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Porras, and further in view of Sarkissian and Fishman. Claim 14-22 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Porras, Fishman, Steinbiss, Sarkissian, Costa and further in view of Aboulnaga.

Applicable Law. The applicable law is recited above in Section I.

Independent claim 13 recites a method for analyzing a stream of network usage data over a rolling time interval. The method includes defining a statistical model for analyzing the stream of network usage data over the rolling time interval; defining the rolling time

interval to include a plurality of the time intervals; receiving a record event from the stream of data for each update time interval; storing the record event for each update interval in a history cache; generating the statistical model over the rolling time interval using the statistical model and each record event stored in the history cache; and updating the statistical model using the statistical model in a most recent record event for a most recent update time interval, including updating only a portion of the statistical model associated with the most recent record event.

Sarkissian merely recites a cache structure for looking up one or more elements of an external memory. The cache structure is used for storing information associated with network packets.

For the same reasons as discussed above with reference to claims 1, 37, and 45, Porras, Sarkissian, and Fishman, either alone, or in combination, fail to teach or suggest **updating only a portion of the statistical model associated with the most recent record event**. In addition, the Examiner appears to have failed to address the limitation **storing the record event for each update interval in a history cache**.

In view of the above, Porras, Sarkissian, and Fishman, either alone, or in combination, fail to teach or suggest the invention of independent claim 13. Accordingly, reversal of the rejection of claim 13 under 35 U.S.C. §103(a) is respectfully requested.

Dependent claim 14-22 further define patentably distinct claim 13. Accordingly, dependent claim 14-22 are also believed to be allowable over the cited references.

Further, dependent claim 14 recites wherein if the history cache is full, updating the statistical model further includes removing the least recent record event set associated with the least recent update time interval from the statistical model. The Examiner submits that Porras, Fishman, Steinbiss, Sarkissian, Costa and Aboulnaga discloses these limitations, in Steinbiss column 5, line 60 to column 6, line 7. (Office Action mailed June 30, 2005, page 20).

Steinbiss discloses a language model based on a speech recognition history. A small vocabulary pattern recognition system is used for recognizing a sequence of words, such as a sequence of digits or a sequence of commands. (See Abstract). Steinbiss does not update the statistical model. Steinbiss merely discloses a first in – first out, cache for a speech recognizer. (Column 5, line 61-column 6, line 7).

In addition, Steinbiss is not analogous art. The speech recognition system is not analogous to a network data usage analysis system. One skilled in the art would not look to a vocabulary pattern recognition system when designing a network data usage analysis system. In addition, there is no teaching or suggestion to combine the network surveillance system or Porras, the method of building predictive models based on transactional data of Fishman, the vocabulary pattern recognition system of Steinbiss, the cache system of Sarkissian, the network management event storage system of Costa, and the self-tuning histogram and database modeling system of Aboulnaga in a manner to provide the invention recited by claim 14.

III. Rejection of claim 23-28 as being unpatentable under 35 U.S.C. §103(a)

Claim 23 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Porras, Sarkissian, and further in view of Kawasaki, and Fishman. Claim 24 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Porras, Sarkissian, Kawasaki, Fishman, and further in view of Steinbiss. Claim 25-26 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Porras, Sarkissian, Kawasaki, Fishman, and further in view of Costa. Claim 27-28 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Porras, Sarkissian, Kawasaki, Costa and further in view of Aboulnaga.

Applicable Law. The applicable law is recited above in Section I.

Independent claim 23 recites a method for analyzing a stream of network usage data over a rolling time interval. The method includes updating only a portion of the statistical model associated with the most recent record event for a most recent update time interval.

Kawasaki discloses a method and system for generating and using a computer user's personal interest profile.

For the same reasons as discussed above with reference to claims 1, 37, and 45, Porras, Sarkissian, Kawasaki, and Fishman, either alone, or in combination, fail to teach or suggest **updating only a portion of the statistical model associated with the most recent record event for a most recent update time interval.**

In addition, there is no teaching or suggestion to combine the method of generating and using a computer user's personal interest profile of Kawasaki with the network

surveillance system of Porras, the cache system of Sarkissian, and the method of building predictive models based on transactional data of Fishman.

In view of the above, Porras, Sarkissian, Kawasaki, and Fishman, either alone, or in combination, fail to teach or suggest the invention of independent claim 23. Accordingly, reversal of the rejection of claim 23 under 35 U.S.C. §103(a) is respectfully requested.

Dependent claim 24-28 further define patentably distinct claim 23. Accordingly, dependent claims 24-28 are also believed to be allowable over the cited references.

IV. Rejection of claims 29-36 as being unpatentable under 35 U.S.C. §103(a)

Claims 29-36 are rejected under 35 U.S.C. §103(a) as being unpatentable over Porras, Sarkissian, Fishman, Costa, and further in view of Aboulnaga.

Applicable Law. The applicable law is recited above in Section I.

Independent claim 29 recites a method for analyzing a stream of network usage data over a rolling time interval. The method includes defining a statistical model for analyzing the stream of network usage data over the rolling time interval, the statistical model including a histogram having a first axis illustrating total usage defined by a number of bins, each bin having a usage variable range, and a second axis defined by a frequency corresponding to a number of users having a total usage within the usage variable range of each bin; defining the rolling time interval to include a plurality of update time intervals; receiving a record event set from the stream of network data for each update time interval; storing the record event set for each update interval in a history cache; generating the statistical model over the rolling time interval using each record event stored in the history cache including generating an aggregation table; and updating the statistical model using a most recent record event for a most recent update time interval including updating only a portion of the aggregation table associated with the most recent update time interval.

Costa merely discloses the use of an aggregation table in tracking network status events.

Aboulnaga discloses building histograms by using feedback information about the execution of query workload rather than by examining the data to help reduce the cost of building and maintaining histograms.

Porras, Sarkissian, Fishman, Costa, and Aboulnaga, either alone, or in combination, fail to teach or suggest **defining a statistical model for analyzing the stream of network usage data over the rolling time interval, the statistical model including a histogram having a first axis illustrating total usage defined by a number of bins, each bin having a usage variable range, and a second axis defined by a frequency corresponding to a number of users having a total usage within the usage variable range of each bin.** Further, none of the cited references, either alone or in combination, teach or suggest **generating the statistical model over the rolling time interval using each record event stored in the history cache including generating an aggregation table; and updating the statistical model using a most recent record event for a most recent update time interval including updating only a portion of the aggregation table associated with the most recent update time interval.**

In addition, there is no teaching or suggestion to combine the network management event storage system of Costa with the self-tuning histograms of Aboulnaga, the network surveillance system of Porras, the cache system of Sarkissian, and the method of building predictive models based on transactional data of Fishman. One skilled in the art could not combine these references in a manner to provide the invention recited by claim 29.

In view of the above, independent claim 29 is not taught or suggested by the cited references. Therefore, reversal of the rejection of claim 29 under 35 U.S.C. §103(a) is respectfully requested.

Dependent claims 30-36 further define patentably distinct claim 29. Accordingly, dependent claims 30-36 are also believed to be allowable over the cited references.

Further, Porras, Sarkissian, Fishman, Costa, and Aboulnaga, either alone, or in combination, fail to teach or suggest updating the statistical model further includes removing a least recent record event set associated with a least recent update time interval from the statistical model (claim 30), defining the statistical model to include an aggregation of each record event stored in the history cache (claim 31), wherein the history cache is an array of memory segments, wherein the number of memory segments is equal to the number of update time intervals in the rolling time interval (claim 32), storing each record event in a memory segment in the history cache (claim 33), defining an index array associated including a set of contiguous index segments wherein each index segment including a pointer to the memory

segment storing in the history cache storing the next consecutive record event (claim 34), defining a first pointer to the index segment associated with the memory segment storing the least recent record event (claim 35), and generating the histogram statistical model from the aggregation table; and updating only a portion of the histogram statistical model associated with the most recent record event set (claim 36).

V. Rejection of claims 3-12, and 39-44 as being unpatentable under 35 U.S.C. §103(a)

Claims 3 and 39 are rejected under 35 U.S.C. §103(a) as being unpatentable over Porras and further in view of Steinbiss. Claims 4 and 40 are rejected under 35 U.S.C. §103(a) as being unpatentable over Porras, Fishman, Steinbiss, and further in view of Sarkissian.

Claims 5-6, 8-10, 12, and 41-44 are rejected under 35 U.S.C. §103(a) as being unpatentable over Porras, Fishman, Steinbiss, Sarkissian and further in view of Costa. Claims 7, 11 are rejected under 35 U.S.C. §103(a) as being unpatentable over Porras, Fishman, Steinbiss, Sarkissian, Costa and further in view of Aboulnaga.

Applicable Law. The applicable law is recited above in Section I.

The Examiner admits Porras and Fishman fail to disclose storing the set of records in a history cache and wherein if the history cache is full updating the statistical model includes removing a least recent record event from the statistical model. The Examiner submits these limitations are taught by Steinbiss (Office Action mailed June 6, 2005, page 16).

Steinbiss also fails to teach or suggest **further comprising the steps of storing the set of record events in a history cache, and wherein if the history cache is full, updating the statistical model includes removing a least recent record event from the statistical model** (claim 3) and **defining a least recent record event; and wherein the data analysis system server removes the least recent record event from the statistical model** (Claim 39).

Steinbiss discloses a language model based on a speech recognition history. A small vocabulary pattern recognition system is used for recognizing a sequence of words, such as a sequence of digits or a sequence of commands. (See Abstract). Steinbiss does not update the

statistical model. Steinbiss merely discloses a first in-first out cache for a speech recognizer. (Col. 5, line 61 – col. 6, line 7).

In addition, Steinbiss is not analogous art. A speech recognition system is not analogous to a network data usage analysis system. One skilled in the art would not look to a vocabulary pattern recognition system when designing a network data usage analysis system. In addition, there is no teaching or suggestion to combine the network surveillance system of Porras, the method of building predictive models based on transactional data of Fishman, and the vocabulary pattern recognition system of Steinbiss in a manner to provide the invention recited by claims 3 and 39. Further, claim 3 further defines patentably distinct claim 1, and claim 39 further defines patentably distinct claim 37. Accordingly, dependent claims 3 and 39 are also believed to be allowable over the cited references.

Claims 4-12 further define patentably distinct claim 3, and dependent claims 40-44 further define patentably distinct claim 39. Accordingly, dependent claims 4-12 and 40-44 are also believed to be allowable over the cited references.

VI. Rejection of claims 46-47 as being unpatentable under 35 U.S.C. §103(a)

Claims 46-47 are rejected under 35 U.S.C. §103(a) as being unpatentable over Porras, Fishman, Steinbiss, Sarkissian, Costa and further in view of Aboulnaga.

Applicable Law. The applicable law is recited above in Section I.

Independent claim 46 recites a method for analyzing a stream of network usage data. The method includes generating a statistical model from a set of network usage record events; receiving a most recent record event; and updating the statistical model using the most recent record event by adding the most recent record event to the statistical model further comprising the steps of: storing the set of record events in a history cache; wherein if the history cache is full, updating the statistical model includes removing a least recent record event from the statistical model, further comprising: defining the statistical model to include an aggregation of each record event set stored in the history cache, wherein an identifier is associated with each record event, and wherein generating a statistical model from the set of record events includes generating an aggregation table for tracking an aggregation of record events associated with an identifier, wherein the most recent record event is associated with an identifier; and wherein updating the statistical model includes updating only the

aggregation of record events in the tracking table for that identifier, further comprising generating a histogram statistical model from the aggregation table, wherein the history cache is an array of memory segments, wherein the number of memory segments is equal to the number of update time intervals in the rolling time interval, and storing each record event in a memory segment in the history cache, and defining an index array associated with the statistical model including a set of contiguous index segments, wherein each index segment includes a pointer to the memory segment in the history cache storing the next consecutive record event, further defining a first pointer to the index segment associated with the memory segment storing the least recent record event, wherein upon receiving a most recent record event the method replacing the least recent record event stored in the history cache with the most recent record event, and further moving the first pointer to the next contiguous index segment.

For the same reasons as discussed above with reference to the above claims, independent claim 46 is not taught or suggested by Porras, Fishman, Steinbiss, Sarkissian, Costa, and Aboulnaga, either alone, or in combination. Additionally, Steinbiss is not an analogous art. There is no teaching or suggestion to combine the network surveillance system or Porras, the method of building predictive models based on transactional data of Fishman, the vocabulary pattern recognition system of Steinbiss, the cache system of Sarkissian, the network management event storage system of Costa, and the self-tuning histogram and database modeling system of Aboulnaga in a manner to provide the invention recited by claim 46. In view of the above and the arguments presented under claim 14, withdrawal of the rejection of claim 46 under 35 U.S.C. §103(a) is respectfully requested.

Dependent claim 47 further defines patentably distinct claim 46. Accordingly, dependent claim 47 is also believed to be allowable over the cited references.

CONCLUSION

The claims of the pending application stand twice rejected. Independent claims 1, 13, 23, 29, 37, and 45 were amended in a Response mailed March 7, 2005 to recite limitations that are not taught or suggested by the cited references. In addition, independent claim 46 was added in the Response mailed March 7, 2005 to recite limitations that are not taught or suggested by the cited references.

For the above reasons, Appellant respectfully submits that the cited references do not render obvious claims of the pending invention. The pending claims distinguish over the cited references, and therefore, Appellant respectfully submits that the rejections must be withdrawn, and respectfully request the Examiner be reversed and claims 1-47 be allowed.

Any inquiry regarding this Appeal Brief should be directed to either Phil Lyren at Telephone No. (281) 514-8236, Facsimile No. (281) 514-8332 or Steven E. Dicke at Telephone No. (612) 573-2002, Facsimile No. (612) 573-2005. In addition, all correspondence should continue to be directed to the following address:

Hewlett-Packard Company
Intellectual Property Administration
P.O. Box 272400
Fort Collins, Colorado 80527-2400

Respectfully submitted,

N. Lee Rhodes,

By his attorneys,

DICKE, BILLIG & CZAJA, PLLC
Fifth Street Towers, Suite 2250
100 South Fifth Street
Minneapolis, MN 55402
Telephone: (612) 573-2002
Facsimile: (612) 573-2005

Dated: January 2, 2006
SED:jan

Steven E. Dicke
Steven E. Dicke
Reg. No. 38,431

CERTIFICATE UNDER 37 C.F.R. 1.8:
The undersigned hereby certifies that this paper or papers, as described herein, are being deposited in the United States Postal Service, as first class mail, in an envelope address to: Mail Stop Appeal Brief – Patents, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on this 2 day of January, 2006.

By Steven E. Dicke
Name: Steven E. Dicke

CLAIMS APPENDIX

1. (Previously Presented) A method for analyzing a stream of network usage data comprising:

generating a statistical model from a set of usage data record events;

receiving a most recent record event; and

updating the statistical model using the most recent record event by adding the most recent record event to the statistical model, wherein an identifier is associated with each record event, including updating only a portion of the statistical model associated with the identifier.

2. (Original) The method of claim 1, wherein updating the statistical model further comprises removing a most recent record event from the statistical model.

3. (Original) The method of claim 1, further comprising the steps of storing the set of record events in a history cache, and wherein if the history cache is full, updating the statistical model includes removing a least recent record event from the statistical model.

4. (Original) The method of claim 3, further comprising defining the statistical model to include an aggregation of each record event set stored in the history cache.

5. (Previously Presented) The method of claim 4, wherein generating a statistical model from the set of record events includes generating an aggregation table for tracking an aggregation of record events associated with an identifier.

6. (Original) The method of claim 5, comprising generating a complex statistical model representative of the network data from the aggregation table.

7. (Original) The method of claim 5, comprising generating a histogram statistical model (130) representative of the network data from the aggregation table.

8. (Original) The method of claim 5, wherein the most recent record event is associated with an identifier; and wherein updating the statistical model includes updating only the aggregation of record events in the tracking table for that identifier.

9. (Original) The method of claim 8, further comprising generating a complex statistical model from the aggregation table.

10. (Original) The method of claim 9, further wherein updating the statistical model includes updating only a portion of the complex statistical model associated with an identifier.

11. (Original) The method of claim 8, further comprising generating a histogram statistical model from the aggregation table.

12. (Original) The method of claim 5, wherein upon receiving a most recent record event the method further comprising replacing the least recent record event stored in the history cache with the most recent record event.

13. (Previously Presented) A method for analyzing a stream of network usage data over a rolling time interval comprising:

defining a statistical model for analyzing the stream of network usage data over the rolling time interval;

defining the rolling time interval to include a plurality of update time intervals;

receiving a record event from the stream of data for each update time interval;

storing the record event for each update interval in a history cache;

generating the statistical model over the rolling time interval using the statistical model and each record event stored in the history cache; and

updating the statistical model using the statistical model and a most recent record event for a most recent update time interval, including updating only a portion of the statistical model associated with the most recent record event.

14. (Original) The method of claim 11, wherein if the history cache is full, updating the statistical model further includes removing a least recent record event set associated with a least recent update time interval from the statistical model.

15. (Original) The method of claim 11, further comprising defining the statistical model to include an aggregation of each record event set stored in the history cache.

16. (Original) The method of claim 11, wherein the history cache is an array of memory segments, wherein the number of memory segments is equal to the number of update time intervals in the rolling time interval.

17. (Original) The method of claim 16, further comprising storing each record event in a memory segment in the history cache.

18. (Original) The method of claim 17, further comprising defining an index array associated including a set of contiguous index segments, wherein each index segment including a pointer to the memory segment storing in the history cache storing the next consecutive record event.

19. (Original) The method of claim 18, further defining a first pointer to the index segment associated with the memory segment storing the least recent record event.

20. (Original) The method of claim 19, wherein upon receiving a most recent record event the method further comprising replacing the least recent record event stored in the history cache with the most recent record event.

21. (Original) The method of claim 20, further comprising moving the first pointer to the next contiguous index segment.

22. (Original) The method of claim 19, further defining a second pointer to the index segment associated with the memory segment storing the most recent record event.

23. (Previously Presented) A method for analyzing a stream of network usage data over a rolling time interval comprising:

defining a statistical model for analyzing the stream of network usage data over the rolling time interval;

defining the rolling time interval to include a plurality of update time intervals;

receiving a record event set from the stream of data for each update time interval, each record event set including one or more record events, wherein each record event is associated with a user identifier;

storing the record event set for each update interval in a history cache;

generating the statistical model over the rolling time interval using each record event stored in the history cache; and

updating only a portion of the statistical model associated with the most recent record event for a most recent update time interval.

24. (Previously Presented) The method of claim 23, wherein if the history cache is full, updating the statistical model further includes removing a least recent record event set associated with a least recent update time interval from the statistical model.

25. (Previously Presented) The method of claim 23, further comprising defining the statistical model to include an aggregation table having an aggregation table entry for tracking an aggregation of each record event set stored in the history cache for each user identifier.

26. (Previously Presented) The method of claim 25, wherein the step of updating the statistical model includes the step of updating only the aggregation table entry associated with the most recent record event.

27. (Original) The method of claim 26, further comprising generating a histogram from the aggregation table.

28. (Original) The method of claim 27, further wherein updating the statistical result includes updating only the portion of the histogram associated with the aggregation table entry associated with the most recent record event.

29. (Previously Presented) A method for analyzing a stream of network usage data over a rolling time interval comprising:

defining a statistical model for analyzing the stream of network usage data over the rolling time interval, the statistical model including a histogram having a first axis illustrating total usage defined by a number of bins, each bin having a usage variable range, and a second axis defined by a frequency corresponding to a number of users having a total usage within the usage variable range of each bin;

defining the rolling time interval to include a plurality of update time intervals;

receiving a record event set from the stream of network data for each update time interval;

storing the record event set for each update interval in a history cache;

generating the statistical model over the rolling time interval using each record event stored in the history cache including generating an aggregation table; and

updating the statistical model using a most recent record event for a most recent update time interval including updating only a portion of the aggregation table associated with the most recent update time interval.

30. (Original) The method of claim 29, wherein if the history cache is full, updating the statistical model further includes removing a least recent record event set associated with a least recent update time interval from the statistical model.

31. (Original) The method of claim 29, further comprising defining the statistical model to include an aggregation of each record event set stored in the history cache.

32. (Original) The method of claim 29, wherein the history cache is an array of memory segments, wherein the number of memory segments is equal to the number of update time intervals in the rolling time interval.

33. (Original) The method of claim 32, further comprising storing each record event in a memory segment in the history cache.

34. (Original) The method of claim 29, further comprising defining an index array associated including a set of contiguous index segments, wherein each index segment including a pointer to the memory segment storing in the history cache storing the next consecutive record event.

35. (Original) The method of claim 34, further defining a first pointer to the index segment associated with the memory segment storing the least recent record event.

36. (Previously Presented) The method of claim 29, further comprising generating the histogram statistical model from the aggregation table; and updating only a portion of the histogram statistical model associated with most recent record event set.

37. (Previously Presented) A network usage analysis system for analyzing a stream of network usage data comprising:

a data analysis system server which generates a statistical model from a set of usage data record events, and upon receiving a most recent record event, the data analysis system server updates the statistical model using the most recent record event by adding the most recent record event to the statistical model, wherein an identifier is associated with each record event, including updating only a portion of the statistical model associated with the identifier.

38. (Original) The system of claim 37, further comprising:

defining a least recent record event; and wherein the data analysis system server removes a least recent record event from the statistical model.

39. (Original) The system of claim 37, further comprising:

defining a history cache, wherein the data analysis system server stores the set of record events in the history cache, and wherein if the history cache is full, updating the statistical model includes removing a least recent record event from the statistical model.

40. (Original) The system of claim 39, further comprising:

defines the statistical model to include an aggregation of each record event set stored in the history cache.

41. (Original) The system of claim 40, wherein an identifier is associated with each record event, and wherein generating a statistical model from the set of record events includes the data analysis system server generating an aggregation table for tracking an aggregation of record events associated with an identifier.

42. (Original) The system of claim 41, wherein the data analysis system server generates a complex statistical model representative of the network data from the aggregation table.

43. (Original) The system of claim 41, wherein the most recent record event is associated with an identifier; and wherein the data analysis system server updating the statistical model includes updating only the aggregation of record events in the tracking table for that identifier.

44. (Original) The system of claim 43, further wherein the data analysis system server generates a complex statistical model from the aggregation table.

45. (Previously Presented) A computer-readable medium having computer executable instructions for performing a method for analyzing a stream of network usage data, the method comprising:

generating a statistical model from a set of usage data record events;

receiving a most recent record event; and

updating the statistical model using the most recent record event by adding the most recent record event to the statistical model, wherein an identifier is associated with each

record event, including updating only a portion of the statistical model associated with the identifier.

46. (Previously Presented) A method for analyzing a stream of network usage data comprising:

generating a statistical model from a set of network usage record events;

receiving a most recent record event; and

updating the statistical model using the most recent record event by adding the most recent record event to the statistical model further comprising the steps of:

storing the set of record events in a history cache;

wherein if the history cache is full, updating the statistical model includes removing a least recent record event from the statistical model, further comprising:

defining the statistical model to include an aggregation of each record event set stored in the history cache, wherein an identifier is associated with each record event, and wherein generating a statistical model from the set of record events includes generating an aggregation table for tracking an aggregation of record events associated with an identifier, wherein the most recent record event is associated with an identifier; and

wherein updating the statistical model includes updating only the aggregation of record events in the tracking table for that identifier, further comprising generating a histogram statistical model from the aggregation table, wherein the history cache is an array of memory segments, wherein the number of memory segments is equal to the number of update time intervals in the rolling time interval, and storing each record event in a memory segment in the history cache, and defining an index array associated with the statistical model including a set of contiguous index segments, wherein each index segment includes a pointer to the memory segment in the history cache storing the next consecutive record event, further defining a first pointer to the index segment associated with the memory segment storing the least recent record event, wherein upon receiving a most recent record event the method replacing the least recent record event stored in the history cache with the most recent record event, and further moving the first pointer to the next contiguous index segment.

47. (Previously Presented) The method of claim 46, wherein the histogram statistical model includes a first statistical model including a histogram having a first axis illustrating total usage defined by a number of bins, each bin having a usage variable range, and a second axis defined by a frequency corresponding to a number of users having a total usage within the usage variable range of each bin.

EVIDENCE APPENDIX

None.

RELATED PROCEEDINGS APPENDIX

None.